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**MODERN MANPOWER PLANNING THROUGH MATHEMATICAL MODELLING**

(A case of sailor workforce planning in Pakistan Navy)

By

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A thesis presented to Bahria University, Islamabad in partial fulfillment of the requirements for the degree of Masters of Philosophy (M.Phil)

**November 2013**

## **Abstract**

**Purpose:** *The aim of the research is to develop a mathematical model for manpower planning in Pakistan Navy that could help overcome chronic shortage of the workforce at lower level. This shortage has been caused by various technical and managerial factors coupled with lack of effective HR planning at operational level over the last three decades.*

**Methodology:** *In this research work simulation modeling technique has been used to develop a HR planning model. The historic administrative data of sailor workforce has been in this model to estimate the transitions probabilities between seven different grades. In order to implement the model an intranet based software was developed to assist Naval HR managers to alter the factors (like accession, promotion and retirement rates) and to analyze the consequences. In order to test the model, it was hypothesized that if navy wanted to double its sailor workforce strength over next 25 years then how many new entry sailors would be induction every year? The existing data of sailor workforce was used as a starting point to generate computer based simulations and different scenarios were tested and picked those that yielded the desired structure.*

**Findings:** *The results of the work showed that if 3175 new entry sailor would be inducted every year for next 25 years then the sailor workforce would be doubled as hypothesized and the current spate of shortage will be overcome.*

**Practical Implications:** *The model will assist the HR managers of Navy to maintain the desired strength of the lower level workforce in Pakistan navy approved by ministry of defense (MOD). Moreover it will also help the policy makers in designing optimal policies for accession, promotion and retirement of the sailors, keeping in view the long term future requirements of the Navy.*

**Keywords:** manpower planning, computer simulations, Markov chains, linear programming, system dynamics.

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